

From: [Eric Blischke](mailto:Eric.Blischke@nwnatural.com)
To: rjw@nwnatural.com
Cc: Jim.McKenna@portofportland.com; ricka@bes.ci.portland.or.us; kpine@anchorenv.com; johnnt@windwardenv.com; jworonets@anchorenv.com
Subject: Benthic Evaluation for Portland Harbor
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Bob:

During last Wednesday's management meeting, you raised a question about the evaluation of the benthic risk approach developed by Don MacDonald. In particular, you were interested in specifics regarding which elements of Don's evaluation should be incorporated into the benthic risk assessment. I have summarized these elements below.

Sections 1 - 3: These sections provide background summary information and should not be considered part of the benthic risk approach.

Section 4: Section 4 provides a number of recommendations for performing the benthic risk assessment. I have broken this section down into its subsections.

Section 4.2: Section 4.2 presents a recommend framework for assessing risks to the benthic community. The key element of this section that should be incorporated into the evaluation process are the two bullets on page 13. The key points in this section are: 1) Empirical data should take precedence over predicted results and 2) The most reliable of the predictive models should be applied in the absence of empirical toxicity results.

Section 4.3: Section 4.3 presents a methodology for designating sediment samples as toxic or non-toxic. The bullets on pages 18 and 19 outline this process and should be followed.

Section 4.4: Section 4.4 presents an approach for developing a reference envelope. We should rely on the 18 stations from upriver as well as any existing stations within the study area that meet the criteria specified on page 21. EPA does not expect that any new data collection will be required to develop a reference envelope.

Section 4.5: Section 4.5 discusses integration of data. Although we have relied in pooling of endpoints in the past, MacDonald recommends that pooling of data be avoided for both the empirical toxicity data and application of the two predictive models because sufficient data are available so that pooling is not required. The unpooling of survival and biomass may provide additional insights into site risks that are lost when the survival and biomass data are pooled. Both the mortality and total biomass endpoints should be looked at for each of the two test organisms. No pooling of endpoints should be performed.

Section 4.6: Section 4.6 outlines the procedures for evaluating relationships between sediment chemistry and sediment toxicity. We should rely on the two models currently being evaluated (floating percentile and logistic regression). Although MacDonald alludes to the use of other modeling approaches, EPA does not believe that this is necessary and expects the two current models to be sufficient.

Section 4.7: Section 4.7 describes the procedures for developing toxicity thresholds. The narrative intent described in this section is a key element of the overall

recommendation. Two risk thresholds should be identified - the low risk and high risk thresholds as described in this section. The low risk threshold (i.e. an incidence of 20% or fewer of the sediment samples are toxic to benthic invertebrates) should be established at COPC/COPC mixture concentrations corresponding to a 10% increase in the magnitude of toxicity to selected test organisms in laboratory toxicity tests relative to the average response rates for test organisms exposed to reference envelope sediments. The high risk threshold (i.e. an incidence of more than 50% of the sediment samples being toxic to benthic invertebrates) should be established at COPC/COPC mixture concentrations corresponding to a 20% increase in the magnitude of toxicity to selected test organisms in laboratory toxicity tests relative to the average response rates for test organisms exposed to reference envelope sediments.

Section 4.8: Section 4.8 outlines the procedures for evaluating concentration-response models. As described in this section, it is important that the reliability criteria used to evaluate model performance must consider the narrative intent. The recommendations for developing appropriate evaluation criteria and evaluation of model performance should be followed.

Section 4.9: This section supports the evaluation of a range of lines of evidence for the evaluation of benthic risk. EPA does not believe that additional sampling is needed to support the RI although additional sampling may be needed to refine risks in support of remedial design.

Section 5.0: Section 5 covers the 7 questions: The answers to each question should be incorporated into approach.

Addendum 1: Addendum 1 presents further evaluation of the approach for assessing risks to the benthic community at the Portland Harbor site. A summary of each subsection is presented below.

Section A1.0 - Introduction; no recommendations to incorporate.

Section A2.0: Section A2.0 presents the response to additional clarifying questions identified by EPA. In general, each of the 4 questions provide additional detail regarding the benthic assessment and should be incorporated into the approach.

Section A3.0: Section A3.0 discusses application of the RSET process at Portland Harbor. Although MacDonald suggests that it is reasonable to review the results of the RSET process and assess applicability to Portland Harbor, he also notes that the narrative intent may not be consistent with the RAOs for Portland Harbor. He further states that there is no need for the site assessment activities to be entirely consistent with RSET guidance or RSET decisions. As a result, the RSET approach should not be incorporated into the benthic risk evaluation for Portland Harbor.

Section A4.0: Section A4.0 describes the development of a reference envelope for the Portland Harbor site. With the exception of the pore water discussion, the recommendations for establishing the reference envelope for the Portland Harbor site should be incorporated in the benthic risk evaluation. However, EPA would like to note that we do not anticipate additional data collection to support this effort.

Section A5.0: Section A5.0 discusses the development of cleanup goals for Portland Harbor. This is beyond the scope of the benthic risk evaluation and should not be

considered as part of the recommendations.

Please review the above list and let us know if you have any questions or require any additional clarification.

Thanks, Eric